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EXAMINER	
GARCIA OTERO, EDUARDO	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/896,136	LIM ET AL.	
	Examiner	Art Unit	
	Eduardo Garcia-Otero	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _29 June 2001_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-50_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-50_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION: Non-Final (first action on the merits)

Introduction

1. Title is: METHOD AND SYSTEM FOR HIGH-RESOLUCTION MODELING OF A WELL BORE IN A HYDROCARBON RESERVOIR.
2. First named inventor is: LIM.
3. Claims 1-50 have been submitted, examined, and rejected.
4. Priority is claimed to US provisional application filing date 6/29/2000.

Index of Prior Art

5. Edwards refers to PCT international publication WO 99/57418.
6. Gibson refers to US Patent 6,054,992.
7. Tarr refers to US Patent 6,191,796.
8. Aftosmis refers to US Patent 6,445,390.
9. Swanson refers to US Patent 4,821,164.

Definitions

10. **"Hexahedrons"** are defined as "For example, they may be cubes or rectangular prisms (equivalently, in two dimensional problems, the elements would be rectangles—see FIGURE 1 for an illustration of these elements)" at Specification page 2. Similarly, Webster's Third New International Dictionary, Merriam-Webster Inc, copyright 1993 defines "hexahedrons" as "a polyhedron of six faces".
11. **"Simplex"** is defined as "a spatial configuration of n-dimensions determined by n + 1 points in a space of dimension equal to or greater than n" by Webster's Third New International Dictionary, Merriam-Webster Inc, copyright 1993.
12. **"Simplex"** is defined as "An n-dimensional simplex in a Euclidean space consists of n + 1 linearly independent points p_o, p_1, ..., p_n together with all line segments $a_o p_o + a_1 p_1 + \ldots +$ $a_n p_n$ where the $a_i > 0$ and $a_0 + \ldots\ a_n = 1$; a triangle with its interior and a tetrahedron with its interior are examples." McGraw-Hill Dictionary refers to The McGraw-Hill Dictionary of Scientific and Technical Terms, Fourth Edition, by McGraw-Hill Companies, Inc., ISBN 0-07-05270-9, 1989. The Examiner uses this McGraw-Hill definition, because it is more precise.

Abstract-objection

13. The abstract of the disclosure is objected to because it is more than 150 words. Correction is required. See MPEP 608.01(b).

Specification-objections-incorporation of essential material

14. The specification at page 3, and page 13, and page 28, and page 29 is objected to as failing to provide proper incorporation of essential material according to MPEP 608.01(p)(I).
15. The attempt to incorporate essential material into this application by reference to copending applications using titles is improper for the reasons discussed below. MPEP 608.01(p)(I)(A)(1) states "If the referenced application has not been published or issued as a patent, applicant will be required to amend the disclosure of the referencing application to include the material incorporated by reference..."

35 USC § 101-statutory subject matter-In re Sarker

16. 35 U.S.C. 101 reads as follows: Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
17. **Claims 1-50 are rejected under 35 U.S.C. 101** because the claimed invention is directed to non-statutory subject matter. Specifically, the claims are directed towards manipulation of an abstract idea, without producing "useful, concrete, and tangible" results as required by *In re Alappat*, 33 F.3d 1524, 1544, 31 USPQ2d 1545, 1557 (Fed. Cir. 1994). Additionally, note *In re Sarker*, 200 USPQ 132, (CCPA), Dec. 7 1978 at page 137 discusses the significance of "post-solution activity" like building a bridge or a dam, and states "While it is true that the final step in each of these claims makes reference to the mathematical result achieved by performing the prior recited steps, we consider the connection to be so tenuous that the several steps recited in each claim when considered as a whole do not constitute a proper method under the statute".
18. In claim 1, "constructing a second finite element mesh... to model a second system" is not statutory subject matter. Note *In re Alappat*, above. Also see MPEP 2106.
19. Claims 2-50 are rejected as non-statutory subject matter for the same reasons as claim 1 above.

35 USC § 112-Second Paragraph-indefinite claims

20. The following is a quotation of the second paragraph of 35 U.S.C. 112: The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

21. **Claims 2, 3, and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite** for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

22. In claim 2, the term "substantially coincident" is not clear.

23. In claim 3, the term "modifying... collapsing" is not clear.

24. In claim 4, the terms "invariant node" and "collapsing..." are not clear.

25. In claim 11, the term "said mesh generation algorithm is Inria" is not clear. The term "Inria" is not adequately defined.

Claim Rejections - 35 USC § 102(a)

26. The following is a quotation of 35 U.S.C. 102(a) which forms the basis for the rejections under this section in this Office action: (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

27. **Claims 1-50 are rejected under 35 U.S.C. 102(a) as anticipated by Edwards, and clarified by Gibson.**

28. Before addressing the specific limitations, some broad discussion of the prior art appears useful. The Edwards Abstract states in full [indentations added by Examiner for clarity]:

> A "near wellbore modeling" software will, when executed by a processor of a computer, model a localized area of a reservoir field which surrounds and is located near a specific wellbore in the reservoir field by performing the following functions:
>
> (1) receive input data representative of a reservoir field containing a plurality of wellbores,
>
> (2) establish a boundary around one specific wellbore in the reservoir field which will be individually modeled and simulated,
>
> (3) impose a "fine scale unstructured grid inside the boundary consisting of a plurality of tetrahedrally shaped grid cells and further impose a fine scale structured grid about the perforated sections of the specific wellbore,

(4) determine a plurality of fluxes/pressure values at the boundary, the fluxes/pressure values at the boundary, the fluxes/pressure values representing characteristics of the reservoir located outside the boundary,

(5) establish one or more properties for each tetrahedral cell of the unstructured grid and each cylindrical grid cell of the structured grid,

(6) run a simulation, using the fluxes/pressure values at the boundary to mimic the reservoir field outside the boundary and using the fine scale grid inside the boundary, to thereby determine a plurality of simulation results corresponding, respectively, to the plurality of grid cells located inside the boundary, the plurality of simulation results being representative of a set of characteristics of the reservoir file located inside the boundary,

(7) display the plurality of simulation results which characterize the reservoir field located inside the boundary, and

(8) reintegrate by coarsening the grid inside the boundary, imposing a structured grid outside the boundary, and re-running a simulation of the entire reservoir field.

29. Note Edwards FIGs 3-8, **<u>especially FIG 8 .</u>**

30. FIG 8 is a two dimensional representation of a three dimensional mesh, and discloses substantially more than is discussed in the Abstract. FIG 8 discloses a total of 4 levels of mesh detail (or mesh fineness). Level 1 is the most fine, and consists of concentric circles (about the wellbore) sliced by radial lines. Level 2 is the second most fine, and consists of radial lines extending to the relatively large mesh. Level 3 consists of relatively large meshes that are not quite square, there are 8 of these relatively large mesh segments. Level 4 consists of large square mesh elements, and none of these are fully shown in FIG 8, but some of the corners are shown, for example at the bottom left of FIG 8 is one corner of a square mesh element. Thus, FIG 8 has a section of mesh with very fine detail adjacent to the wellbore (Level 1, concentric circles with radial lines), and a section of mesh with very coarse square mesh (Level 4, squares), and two sections of intermediate mesh (Level 2, and Level 3). This use of small sized elements in the important areas and larger sized elements in the less critical areas is a common simulation technique to conserve (or efficiently allocate) computer resources, particularly during finite element method (FEM), also known as finite element analysis (FEA).

31. Note that the Edwards FIGs disclose a wide variety of techniques for sizing meshes about a wellbore.
32. Further, the Edwards Abstract step (3) term "impose a fine scale structured grid" is interpreted in view of the Gibson patent. Gibson Abstract line 3 discloses "modeling of object cutting, joining, and tearing", which clarifies Edward's term "impose". In other words, Gibson explicitly discusses a typical mesh manipulation procedure for cutting an initial mesh into two separated meshes. The Gibson model is very detailed, and can even simulate object deformation during cutting. The instant claim 1 refers to said cutting as "adapting said first mesh such that it comprises said second mesh and a third mesh", and Edwards uses the term "imposing" in place of the claim 1 term "adapting", and Edwards displays the adapted/imposed results at FIG 8.
33. Claim 1 is an independent "method" claim with 4 limitations, numbered by the Examiner for clarity. Claim 1 will be discussed in extreme detail, and the remaining claims in slightly less detail.
34. In claim 1 limitation [1], **"constructing said first mesh having a plurality of n-dimensional simplices corresponding to said first system"** is disclosed by Edwards FIG 3-9 and Abstract.
35. Specifically, Edwards Abstract "(2) establish a boundary around one specific wellbore in the reservoir field which will be individually modeled and simulated", and "(3) ... plurality of tetrahedrally shaped grid cells". Note that the McGraw-Hill dictionary defines Simplex as "An n-dimensional simplex in a Euclidean space consists of n + 1 linearly independent points $p_o, p_1, \ldots, p_n$ together with all line segments $a_o p_o + a_1 p_1 + \ldots + a_n p_n$ where the $a_i > 0$ and $a_0 + \ldots a_n = 1$; a triangle with its interior and a **tetrahedron with its interior are examples.**" Emphasis added. Thus, the Edwards "plurality of tetrahedrally shaped grid cells" is a mesh of simplices.
36. In claim 1 limitation [2], **"defining a surface bounding said second system"** is disclosed by Edwards FIG 3-9 and Abstract.
37. Specifically, Edwards Abstract "(3)... further impose a fine scale structured grid about the perforated sections of the specific wellbore". Note that the Edwards term "impose" inherently requires selecting a region in which to impose said fine scale structured grid,

which is identical to the claim 1 term "defining a surface bounding". Again, Gibson Abstract line 3 discloses "modeling of object cutting, joining, and tearing", which clarifies Edward's term "impose".

38. Note that Edwards uses slightly different terminology, and uses the term "boundary" at FIG 6 to represent what claim 1 would define as the exterior boundary of the first mesh, and not the imposed boundary ("surface bounding") which divides the first mesh into a second and third mesh.
39. In claim 1 limitation [3], **"identifying a subset of the plurality of n-dimensional simplices of said first mesh that are intersected by said surface"** is disclosed by Edwards FIG 3-9 and Abstract.
40. Specifically, Edwards Abstract "(3)... further impose a fine scale structured grid about the perforated sections of the specific wellbore". Note that the Edwards term "impose" inherently requires selecting a bounded region in which to "impose" said fine scale structured grid, which is identical to the claim 1 term "defining a surface bounding". Again, Gibson Abstract line 3 discloses "modeling of object cutting, joining, and tearing", which clarifies Edward's term "impose". Said imposing inherently requires identifying (and breaking) the mesh segments that intersect the bounding surface.
41. In claim 1 limitation [4], **"modifying the identified subset of the plurality of n-dimensional simplices to adapt said first mesh such that it comprises said second mesh and a third mesh, wherein said second mesh comprises a first set of simplices located entirely interior to said surface and wherein said third mesh comprises a second set of simplices located entirely exterior to said surface"** is disclosed by Edwards FIG 3-9 and Abstract.
42. Specifically, Edwards FIG 8 discloses four levels of mesh fineness, with three internal boundaries separating the levels of fineness, and with one external or overall boundary as shown in FIG 6. Thus, Edwards FIG 8 discloses a first overall coarse mesh (squares), and then using 3 internal bounding surfaces to impose a second, third, and fourth mesh, and the remaining original coarse mesh would be a fifth mesh. Edwards' fifth mesh corresponds to claim 1 third mesh, and Edwards' second or third or fourth mesh correspond to claim 1

second mesh, and Edwards' initial "fine scale unstructured grid inside the boundary" (before imposing anything) corresponds to claim 1 first mesh.

43. In summary, Edwards FIG 8 clearly discloses beginning with a coarse mesh, and internally generating finer meshes in selected regions.
44. In claim 2, **"modifying said identified subset of said plurality of n-dimensional simplices further comprises subdividing each of said simplices in said identified subset into a plurality of new simplices, and wherein a plurality of faces of said subdivided simplices are substantially coincident with said surface"** is disclosed by Edwards FIG 3-9 and Abstract.
45. Specifically, Edwards FIG 8 demonstrates the Edwards Abstract term "imposing". The Gibson patent is presented to clarify Edward's term "impose". Gibson discloses "modeling of object cutting, joining, and tearing", which is clarifies Edward's term "impose". In other words, Gibson explicitly discusses a typical mesh manipulation procedure for cutting an initial mesh into two separated meshes. The Gibson model is very detailed, and can even simulate object deformation during cutting.
46. In claim 3, **"modifying said identified subset of the plurality of n dimensional simplices comprises collapsing each of said simplices in said identified subset"** is disclosed by Edwards FIG 3-9 and Abstract.
47. Claim 3 is rejected above as indefinite for the term "collapsing". Possibly Applicant intends destroying or deleting the intersected or cut cells, and then somehow fusing or joining the internal cells with the external cells. Edwards FIG 8 uses a rather complex method of two intermediate sized regions to joint the innermost region (finest) with the outermost region (coarsest), as described in detail above.
48. In claim 4, **"each of said n-dimensional simplices has a plurality of nodes and a plurality of edges connecting said nodes, wherein at least one of said nodes is invariant and wherein collapsing each of said simplices in said identified subset comprises removing one or more of said nodes, preventing removal of the invariant nodes, and forming simplices based upon the remaining nodes"** is disclosed by Edwards FIG 3-9 and Abstract.
49. Claim 4 is rejected above as indefinite for the terms "invariant nodes" and "collapsing". However, claim 4 appears to be disclosed by FIG 8.

50. In claim 5, **"said first and said second systems are three dimensional systems, wherein n=3, and wherein said surface is an (n-1)-dimensional surface"** is disclosed by Edwards FIG 3-9 and Abstract.
51. Specifically, Edwards FIG 8 is a two dimensional cross section of a three dimensional system, and the Edwards term "imposing" implies imposing an internal three dimensional volume with a two dimensional bounding surface. Reservoirs are three dimensional, so it is standard procedure to use three dimensional modeling, note the terms "tetrahedrally shaped" and "cylindrical grid cell" in Edwards Abstract.
52. In claim 6, **"said (n-1)-dimensional surface corresponds to a well bore surface, and wherein said (n-1)-dimensional surface is defined by a depth along a well bore trajectory and a radius from said well bore trajectory"** is disclosed by Edwards FIG 3-9 and Abstract.
53. Specifically, Edwards Abstract states "cylindrical grid cell", and a cross section of the cylinder is shown at FIG 8.
54. In claim 7, **"said first system is a reservoir"** is disclosed by Edwards Abstract "reservoir field"
55. In claim 8, **"said second system is a well bore"** is disclosed by Edwards Abstract "wellbore".
56. In claim 9, **"said defining step further comprises providing a well bore trajectory, a radius from said trajectory, and a depth along said trajectory"** is disclosed by Edwards FIG 6 "Wellbore 1".
57. In claim 10, **"said step of constructing said first mesh is perform using a mesh generation algorithm"** is disclosed by Edwards Abstract "software… model a localized area of a reservoir field"
58. In claim 11, **"said mesh generation algorithm is Inria"** is disclosed by Edwards Abstract "software… model a localized area of a reservoir field".
59. In claim 12, **"each of the n-dimensional simplices in said identified subset of the plurality of n-dimensional simplices is intersected by an (n-1)-dimensional surface"** is disclosed by Edwards Abstract "impose". Gibson discloses "modeling of object cutting,

joining, and tearing", which is clarifies Edward's term "impose". See detailed discussion in the claim 1 rejection above.

60. In claim 13, **"the (n-1)-dimensional surface intersects at least one edge of each of the n-dimensional simplices in the identified subset of the plurality of n-dimensional simplices"** is disclosed by Edwards Abstract "impose". Gibson discloses "modeling of object cutting, joining, and tearing", which is clarifies Edward's term "impose". See detailed discussion in the claim 1 rejection above.

61. In claim 14, **"each of said n-dimensional simplices has a plurality nodes and a plurality of edges connecting said nodes, and wherein the method further comprises identifying intersections between the edges of said subset of simplices and said surface, defining a new node at each of said identified intersections, and defining at least two new simplices incorporating said new nodes"** is disclosed by Edwards Abstract "impose". Gibson discloses "modeling of object cutting, joining, and tearing", which is clarifies Edward's term "impose". See detailed discussion in the claim 1 rejection above.

62. In claim 15 **"said first system comprises a multi-level reservoir"** is disclosed by Edwards Abstract "reservoir field". Edwards is interpreted broadly as disclosing single-level reservoirs and multi-level reservoirs. Further, see *In re Harza* (legal precedent for duplication), 274 F.2d 669, 124 USPQ 378, 380 (CCPA 1960) which states "It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced". See MPEP 2144.04(VI)(B). In this claim, multi-level reservoirs does not produce any new result and does not produce any unexpected result in comparison with single level reservoirs.

63. In claim 16, **"altering the value of system properties in said second mesh and in said third mesh near said second mesh to predict changes in system behavior for said second system"** is disclosed by Edwards Abstract "(6) run a simulation, using the fluxes/pressure values at the boundary to mimic the reservoir field outside the boundary and using the fine scale grid inside the boundary, to thereby determine a plurality of simulation results corresponding, respectively, to the plurality of grid cells located inside the boundary, the plurality of simulation results being representative of a set of characteristics of the reservoir file located inside the boundary"

64. In claim 17, **"said method steps are performed on a computer"** is disclosed by Edwards Abstract "software". Note that software is run on a computer (hardware).
65. In claim 18, **"said computer comprises a graphical user interface for inputting user instructions and parameter values"** is disclosed by Edwards Abstract "software". Note that computer aided design (CAD) software implicitly requires a user interface of at least a monitor and a keyboard.
66. Claims 19-32 are "computer readable medium" claims, and are rejected for the same reasons as "method" claims 1-18 above.
67. In claim 33 limitation [1], **"defining a plurality of two-dimensional boundaries of said reservoir"** is disclosed by Edwards FIG 6 "BOUNDARY".
68. In claim 33 limitation [2], **"generating a two-dimensional surface triangulation mesh on one or more of said reservoir boundaries"** is disclosed by Edwards FIG 6 "BOUNDARY".
69. In claim 33 limitation [3], **"defining said well bore within said reservoir, wherein said well bore comprises an isosurface within said reservoir"** is disclosed by Edwards FIG 6 "BOUNDARY" and "RESERVOIR FIELD", and FIG 5 "WELLBORE".
70. In claim 33 limitation [4], **"constructing a well-bore mesh, having a plurality of three-dimensional simplices, corresponding to said well bore, wherein a plurality of triangular faces of a subset of said simplices form a well bore surface triangulation and lie substantially coincident with said well bore isosurface"** is disclosed by Edwards FIG 6 "BOUNDARY" and "RESERVOIR FIELD" and FIG 5 "WELLBORE".
71. In claim 33 limitation [5], **"constructing a reservoir mesh from said surface triangulation to fill said reservoir"** is disclosed by Edwards FIG 6 "BOUNDARY" and "RESERVOIR FIELD" and FIG 5 "WELLBORE".
72. In claim 34, **"constructing a reservoir mesh step further comprises preserving said surface triangulation on said reservoir boundaries and on said well bore isosurface"** is disclosed by Edwards FIG 6 "BOUNDARY" and "RESERVOIR FIELD" and FIG 5 "WELLBORE".
73. In claim 35, **"defining step further comprises providing a well bore trajectory, a radius from said trajectory, and a depth along said trajectory"** is disclosed by Edwards FIG 5 "WELLBORE".

74. In claim 36, **"said step of constructing a well bore mesh and said step of constructing a reservoir mesh are performed using a mesh generation algorithm"** is disclosed by Edwards FIG 5 "WELLBORE" and Abstract "software... model a localized area of a reservoir field".
75. In claim 37, said **"mesh generation algorithm is Inria"** is disclosed by Edwards Abstract "software... model a localized area of a reservoir field".
76. In claim 38, **"said step of constructing a well bore mesh and said step of constructing a reservoir mesh are performed using a mesh generation algorithm"** is disclosed by Edwards FIG 5 "WELLBORE" and Abstract "software... model a localized area of a reservoir field".
77. In claim 39, **"comprising the step of altering the value of system properties in said second mesh and in said third mesh near said second mesh to predict changes in system behavior for said second system"** is disclosed by Edwards FIG 5 "WELLBORE" and Abstract "software... model a localized area of a reservoir field" and FIG 8.
78. In claim 40, **"said method steps are performed on a computer"** is disclosed by Edwards Abstract "computer".
79. In claim 41, **"computer comprises a graphical user interface for inputting user instructions and parameter values"** is disclosed by Edwards Abstract "software... computer... receive input data".
80. Claims 42-50 are "computer-readable medium" claims with the same limitations as "method" claims 33-41 above respectively, and thus are rejected for the same reasons.

Additional Cited Prior Art

81. The following US patents or publications are hereby cited as prior art, but have not been used for rejection. Applicant should review these carefully before responding to this office action.
82. Tarr US Patent 6,191,796 discloses tools interacting with meshes at Abstract. Applicant's claim 1 "defining a surface bounding" is equivalent to defining a cutting tool path in Tarr FIG 1B.
83. Aftosmis US Patent 6,445,390 discloses "mesh generation" at Abstract.
84. Swanson US Patent 4,821,164 discloses "surface bounding said volume" at Abstract.

Conclusion

85. All pending claims stand rejected.

Communication

86. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo Garcia-Otero whose telephone number is 703-305-0857. The examiner can normally be reached on Monday through Thursday from 9:00 AM to 8:00 PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for this group is 703-872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

* * * *

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER